



*Castilleja linariifolia*

# Castilleja

Publication of the Wyoming Native Plant Society

May 2018, Volume 37(2)

Posted at [www.wynps.org](http://www.wynps.org)

## Varieties as the Spice of Life

The new Wyoming Flora Checklist reports 2997 species established in the state, a biodiversity benchmark for a species-rich state. But that isn't all. Varieties and subspecies are addressed below the species level. A total of 873 varieties or subspecies are recognized.

What does this mean if over 25% of the state flora is at these finer taxonomic levels? Many articles or dissertations could be written about the variety-level diversity and any of the taxonomic cases. Laramie tourgoers on an Extension hike (see p. 4) will have a chance to see what Ackerfield (2015) calls the "Laramie Hills clover" in flower – that is, *Trifolium dasyphyllum* var. *anemophilum*. It is geographically isolated from the rest of species' distribution in northwestern Wyoming and elsewhere in the Rockies, barely reaching Larimer County, Colorado.

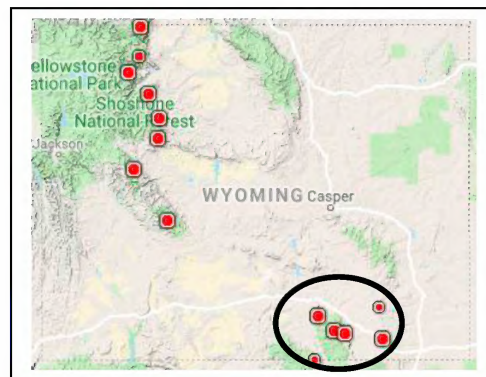
The Wyoming Flora Checklist is posted at: <http://www.uwyo.edu/wyndd/files/docs/wyoming-checklists/flora-of-wyoming-checklist.pdf>; Nelson (2018).

### References

- Ackerfield, J. 2015. Flora of Colorado. Botanical Research Institute of Texas, Fort Worth, TX.
- Nelson, B.E. 2018. Wyoming Flora Checklist. posted at: (<http://www.uwyo.edu/wyndd/files/docs/wyoming-checklists/flora-of-wyoming-checklist.pdf>).



Above: "Laramie Hills clover", by Bonnie Heidel



Left: Wyoming distribution of *Trifolium dasyphyllum*, from RM online specimen database, with a circle around the "Laramie Hills clover"

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## WYNPS News

### 2018 Scholarship and Grant Winners announced:

Three winners of the Markow Scholarship/Grant, awarded by Wyoming Native Plant Society, were recently announced by the Board:

- 23<sup>rd</sup> Street Wildscape, \$500 grant award to Jane Greaser, Laramie, WY.
- The Genetic basis of adaptive alpine dwarfism in *Aquilegia*, \$750 scholarship to Jason Johns, in the Ecology, Evolution and Marine Biology Department, University of California, Santa Barbara
- Linking soil ecology with vegetation management to optimize efforts of Ponderosa pine after wildfires, \$864 scholarship to Stephanie Winters, in the Ecosystem Science and Management Department, University of Wyoming, Laramie.

2018 Annual Meeting, July 20-22: Register now for the 2018 Wyoming Native Plant Society annual meeting! The Registration form is on the next page or you can register on-line ([www.wynps.org](http://www.wynps.org)). ...See you there!!



If it were possible to imbue a planet and a piece of paper with happiness, then this issue would radiate earthly happiness because its preparation overlaps with Earth Day. The health-and-happiness of Wyoming, if not an entire planet, is a lofty goal to which we might all aspire.

New Members: Please welcome the following new member to WYNPS: Kathy McCurdy, Jackson.

### WYNPS Board – 2018

President: Charmaine Delmatier, Washington  
([delmatier@wyoming.com](mailto:delmatier@wyoming.com))

Vice-President: Katy Duffy, Jackson  
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Sec.-Treasurer: Dorothy Tuthill, Laramie  
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Teton Plants: Amy Taylor, Treasurer;  
([tetonplants@gmail.com](mailto:tetonplants@gmail.com)). *Check the chapter homepage for an exciting slate of talks!*

Also: Bighorn Native Plant Society: Jean Daly, Treasurer (P.O. Box 21, Big Horn, WY 82833)

Check out the Wyoming Native Plant Society Facebook page

(<https://www.facebook.com/Wyoming-Native-Plant-Society-207193329359065/>). Remember, if you are looking for a place to show off your favorite 2018 plant photos, look no farther.

Treasurer's Report: Balance as of 18 April 2018:  
Scholarship = \$151; General = \$7,518; Total = \$7,669.

Contributors to this Issue: Frances Clark, Robert Dorn, Bonnie Heidel, Dorothy Tuthill.

Next Issue: The volume of botany news can be overwhelming, we each see or hear different segments, and experience different aspects. Sometimes the most important matters are the ones that do NOT get reported. Please send your announcements, articles, comments and ideas. The next newsletter deadline is 15 Sept.

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Wyoming Native Plant Society  
P.O. Box 2449  
Laramie, WY 82073

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## 2018 WYNPS ANNUAL MEETING REGISTRATION

This event is open to the public; membership in the Society is not required. However, registration is required to attend. Please register by July 10, 2018 to help us prepare. No dogs, please, on any of the hikes.

Registration fee is \$10/person.



Name(s) \_\_\_\_\_

Address \_\_\_\_\_

How many people are you registering for? \_\_\_\_\_

Which days do you plan to attend? Please circle.

Friday    Saturday    Sunday    Monday

### Group Camping

Hams Fork Campground is a first-come, first-serve campground with 13 sites, two vault toilets, and potable water. Several people are planning to arrive early to occupy campsites for WYNPS. There are no other close-by campgrounds, but dispersed camping is allowed in the National Forest. In addition, there are several motels in Kemmerer, which is about 40 slow miles away.

The cost is \$7 per night per site at Hams Fork.

Do you plan to camp at Hams Fork?    Yes    No

### Tables and chairs

Everyone should bring a camp chair for the evening program, business meeting, and socializing. In addition, we would like to have tables and canopies to use at the central location.

Can you bring any of these items that can be used at a central location at the campground?

Table    Yes    No

Canopy    Yes    No

Please mail form and check to WYNPS, PO Box 2449, Laramie, WY 82073



## **DISCOVER NATIVE PLANTS: Walk and Workshop Series by Wyoming Extension Service**

Wyoming Extension Service announces three DISCOVER NATIVE PLANTS events around the state in coming months! They combine an outdoor walk and an indoor workshop for a day of discovery at three locations and dates (below).

Calendar of 2018 Discover Native Plants Events

<b>Town</b>	<b>Date</b>	<b>Place</b>
Laramie	19 May	Hike on State Section east of town; workshop in Aven Nelson Bldg. (see below)
Cody	15 June	TAC Retreat Center (for both hike and workshop)
Between Buffalo and Worland	19 July	Antelope Butte Mountain Recreation Area (for both hike and workshop)

The University of Wyoming Extension and Rocky Mountain Herbarium are teaming up with local organizations to offer a Discover Native Plants walk and workshop in Laramie on May 19. The plant walk is free and scheduled from 9:00 to 11:30 am. The Laramie workshop includes a materials fee of \$20.00. Registration is encouraged for the hike and required for the workshop:

Click <https://www.eventbrite.com/e/discover-native-plants-walk-and-workshop-tickets-45254990896> ; or enter: <https://bitly/2vEnuPx> .

Participants can attend one or both hike and workshop. If you are joining the plant walk, please come prepared for moderate hiking and Laramie's unpredictable weather. The group will meet at the corner of E. Crow Drive and 45<sup>th</sup> Street (see the Google map posted at the link). Due to limited parking, carpooling is encouraged. We will visit the State School Section on the east edge of Laramie, a special springtime display of native plants at the flanks of the Casper Formation where the Laramie Foothills meet City limits.

The workshop will meet at the Aven Nelson building on campus at 1:00 pm in Room 223 (elevator and stair access). Workshop participants will receive a plant guide and materials to learn plant identification skills and botanical terminology. Participants will have the opportunity to practice plant ID for up to 15 species, and door prizes will be available. Workshop attendance is limited to 24. The Aven Nelson building is located on 9<sup>th</sup> Street right beside the Classroom Building.

Please contact Brian Sebade (721-2571; [bsebade@uwyo.edu](mailto:bsebade@uwyo.edu)) if you have questions about the plant walk, and Kristina Hufford ([khufford@uwyo.edu](mailto:khufford@uwyo.edu)) with questions about the workshop. Participating organizations include the UW Biodiversity Institute, US Forest Service, Laramie Rivers Conservation District, and Barnyards & Backyards. We look forward to seeing you!

To get more information on the June and July events, watch for announcements in local newspapers, contact local Extension Service offices or look for postings in the Wyoming Eventbrite link to register:

<https://www.eventbrite.com/d/wy--wyoming/events/> .

<https://www.eventbrite.com/e/discover-native-plants-walk-and-workshop-tickets-45254990896>





Left: Whitebark pine (*Pinus albicaulis*) and lodgepole pine (*Pinus contorta*) regenerating at Henderson Mountain after the 1988 Yellowstone Fires. Photo by Marian Lea (2016).

### **Development of nuclear microsatellite loci in *Pinus albicaulis* Engelm. (Pinaceae), a conifer of conservation concern**

By Marian Lea, University of Colorado - Denver

Whitebark pine (*Pinus albicaulis* Engelm.) is a widely-distributed high elevation western North American tree. It is a candidate for listing under the U.S. Endangered Species Act and has experienced widespread declines. Whitebark pine is a host for mountain pine beetle (*Dendroctonus ponderosae* Hopkins), which erupted in large-scale outbreaks in the Rocky Mountains and elsewhere in the West over the past 20 years. It is also susceptible to white pine blister rust (caused by the pathogen *Cronartium ribicola* J.C. Fisch.), which continues to spread.

Genetic diversity helps maintain forest health by providing resilience against pests, pathogens, and environmental fluctuations. Over time, loss of heterozygosity can decrease fitness and threaten long-term population and species persistence. It is imperative to determine how much genetic diversity will remain in whitebark pine populations as they decline in response to white pine blister rust infection and mountain pine beetle outbreaks, especially for trees remaining as seed sources after disturbances such as fires. Further, the time needed to recover genetic diversity following fires will be an essential research question as time intervals between fires decrease as a result of climate change. The Greater Yellowstone Ecosystem in particular is projected to experience reduced intervals between wildfires, decreasing from the historical average of 100-500 years to less than 30 years by 2099. Given this trend, it is essential to predict whether whitebark pine will be able to recover genetic diversity rapidly enough to avoid bottlenecks.

Our objectives were to develop reliable nuclear microsatellite markers to assess within-population genetic diversity and seed and pollen migration dynamics, and to validate markers using two geographically proximal populations. Neutral markers like nuclear microsatellites offer a rapid way to screen populations to separate individuals into related groups, which can be used to prioritize areas for blister rust resistance screening, and to explore strategies to mitigate effects of climate change. A total of 23 nuclear microsatellite loci were developed and validated using 40 total samples split between Henderson Mountain, MT and Mount Washburn, WY. Overall, both populations were quite similar in measures of genetic diversity. These populations also had no spatial patterns in the relatedness of individuals, and there was little genetic differentiation between the populations.

Given the need to monitor population changes and accomplish conservation goals in whitebark pine, microsatellite markers with large numbers of alleles may be the best available option to measure differences in population genetic diversity and structure. This may help determine regions to focus screening for resistance to pests and pathogens, and indicate populations most in need of management intervention, especially as white pine blister rust continues to spread. Studies assessing genetic diversity based on these loci can help guide future conservation efforts and restoration plans for whitebark pine.

(Marian Lea is 2016 scholarship recipient for her thesis work on: *Recovery of genetic diversity in whitebark pine (Pinus albicaulis Engelm.) a quarter century after the 1988 Yellowstone fires.*)



By Robert Dorn

*Helianthus petiolaris*, Prairie Sunflower, is an annual to 4 feet tall and 2.5 feet wide. The leaves are lanceolate or ovate to almost triangular, to 6 inches long and 4 inches wide. The flowers are in a typical sunflower head with yellow ray flowers around a central cluster of mostly brownish disk flowers, the heads to 4 inches across, and at the tips of stems and branches. They appear from June to September. The plants occur naturally in disturbed sites and in loose soils of the plains, basins, and valleys. They prefer loose, well drained soils and full sun. They are easy to grow from seed.



*Helianthus petiolaris*, Goshen County



*Pectis angustifolia*, Goshen County

*Pectis angustifolia*, Lemonscent, is an annual to 8 inches tall and wide with much branched stems and a lemon scent. The leaves are opposite, narrow, and to 2 inches long. The flowers are in the typical Composite head with yellow ray flowers surrounding a central cluster of yellow disk flowers, the heads to 0.5 inch across and clustered at the stem tips. They appear in August and September. The plants occur naturally in dry sandy or gravelly areas of the plains. They prefer full sun and a dryish, well drained soil. They can be grown from seed which is commercially available.

*Rudbeckia laciniata*, Goldenglow, is a perennial to 7 feet tall. The leaves are usually toothed or lobed, to 6 inches long and 4 inches wide. The flowers are in the typical Composite head with yellow reflexed ray flowers surrounding a cluster of yellowish disk flowers which form a short cone. The heads are to 5 inches across at the tips of the stems. They appear from July to September. The plants occur naturally in moist, open or partly shaded areas in the plains, basins, valleys, and foothills. They prefer full sun or partial shade and moist to wet soils. They can be grown from seed. Cold stratification for 30 days will help germination of stored seed. The plants may not bloom until their second year. They can also be transplanted easily.



*Rudbeckia laciniata*, Ouray County, Colorado



*Xerophyllum tenax*, Beargrass, is a perennial forming a large clump to 3 feet wide with stems to 4.5 feet tall. The leaves are mostly basal, very narrow and grass-like, rigid, and to 2 feet long. The flowers are white to cream, each to 0.5 inch across, but borne in a dense club-shaped cluster to 20 inches long and 4 inches across at the tips of the stems. They appear from May to August depending on elevation. The plants occur naturally in open woods and on slopes in the mountains. They prefer full sun to partial shade and dry to moist, loamy, well drained soils in cooler areas. It does not bloom consistently every year. The plants can be grown from seed that has been cold stratified for 90 days or more, or sow outdoors in the fall. Rootstocks can be divided in the fall. Seed is commercially available.



*Xerophyllum tenax*, Ravalli County, Montana

*To see the above plants in color, go to the newsletter on the Society website.*

*Pteridium aquilinum*, Bracken Fern, is a perennial fern to 6 feet tall. It spreads by creeping rhizomes and can be aggressive forming large colonies. The leaves are triangular in outline, to 6 feet long with the blade and petiole each about half the total length. The young leaves are poisonous. The plants occur naturally in open woods and other openings in the mountains. They tolerate full sun to shade and prefer moist, well drained soils but are drought tolerant. They spread readily so will need to be controlled regularly. They are easily grown from rhizome cuttings and are in the nursery trade.



*Pteridium aquilinum*, Crook County



*Prunus pumila* var. *besseyi*, Larimer Co., Colorado  
Cultivated



## Spring Emerging – April 2018

(Reprinted from Teton Plants Blog by Frances Clark, 22 April 2018. To see more featured spring ephemerals, go to: <https://tetonplants.org/blog/> )

Our first flowers are finally revealing themselves as the snow melts along road verges, fields, sage flats, and open forests on the valley floor.

Many early wildflowers are “spring ephemerals”: they flower before there is competition for light by larger plants and then disappear, leaves and all, within a few weeks. They have adapted to this niche of opportunity. Often just a few inches high, they are best observed on one’s belly – belly botany.

Leading the pack are many buttercups. **Utah Buttercup** – *Ranunculus jovis* has 3-parted leaves and fleshy, tuberous roots. So far I have seen these frequently under cottonwoods and in rough fields.



Above: The best position for admiring Utah buttercup.

**Wyoming Native Plant Society** is a non-profit organization established in 1981 to encourage the appreciation and conservation of the native plants and plant communities of Wyoming. The Society promotes education and research through its newsletter, field trips, annual student scholarship and small grants awards. Membership is open to individuals, families, or organizations. To join or renew, please return this form to:

Wyoming Native Plant Society  
P.O. Box 2449  
Laramie, WY 82073

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Email : \_\_\_\_\_

Check one: ☐ New member ☐ Renewing member

☐ Renewing members, check here if this is an address change.

☐ Check here if you prefer to receive the newsletter electronically

### Membership

☐ WYNPS annual membership: \$10.00

☐ WYNPS annual membership + scholarship support: \$20.00

(\$10.00 for membership and \$10.00 for Scholarship fund)

☐ WYNPS Lifetime membership: \$300 (\$150 for membership and \$150 for Scholarship fund)

☐ Sublette Chapter annual membership: \$5.00

☐ Teton Chapter annual membership: \$5.00

Total enclosed: \_\_\_\_\_ THANK YOU!

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